

Abstract of the Disclosure

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5 An impurity precipitation region is formed by introducing
an impurity, e.g., oxygen, into a silicon substrate or a silicon
layer and thermally treating it, and performing high selectivity
anisotropic etching with the precipitation region used as a
micro mask. Thus, a cone (conic body or truncated conic body
having an annular leading end) having a very sharp and slender
needle shape with an aspect ratio of about 10 and a diameter of
10 about 10 nm to 30 nm in the vicinity of its leading end is
obtained with the micro mask used as the top. By forming an
insulation layer and a drive electrode such as a gate electrode
around the cone, the cone can be used for a field emission
device, a single electron transistor, a memory device, a high
15 frequency switching device, a probe of a scanning type
microscope or the like.